

FIBER OPTIC CABLE RACEWAY OUTLET AND METHOD

Technical Field and Background of the Invention

[0001] This application is based on and claims priority from a provisional application filed on January 12, 2001, Serial No. 60/261,563.

[0002] This invention relates to a cable raceway outlet. Such outlets are essential in the proper design and operation of fiber optic cable telecommunication systems. Fiber optic cable management often requires that fiber optic cables be routed between fiber optic distribution equipment and, for example, fiber optic line terminating equipment in buildings and other structures. Fiber optic cables are susceptible to damage if bent or crimped beyond a certain point. Standards have evolved which govern the degree of bend radius permitted in fiber optic cables of specified sizes.

[0003] Fiber optic cables are thus routed along raceways which are designed to protect the cable from damage while permitting access for modification, maintenance, connection and repair. These raceways are typically top-opening plastic troughs similar in configuration to rain gutters into which the cables are placed and along which the cables run from point-to-point. Fiber optic cables generally exit the raceway over one of the side walls and thus provision must be made to guide and support the cable to prevent damage from bending or crimping at this point of exit. Of course, the raceway outlet can also be used with other cable types, such as copper.

[0004] This invention provides a simple and inexpensive means of providing an outlet for such cables over the side of the raceway without any modification to the raceway itself. The outlet according to the invention is easily moveable, adaptable to many different raceway sizes and configurations, and provides all necessary support and bend restriction to the cable. The raceway outlet provides full protection to the raceway by covering the

open top, while permitting easy access to the raceway when laying new cable or removing or repairing existing cable.

Summary of the Invention

[0005] Therefore, it is an object of the invention to provide a cable raceway outlet which can be easily installed on a wide variety of raceway sizes and configurations.

[0006] It is another object of the invention to provide a cable raceway outlet which is easily movable to different locations on the raceway.

[0007] It is another object of the invention to provide a cable raceway outlet which requires no tools or other equipment for installation or movement.

[0008] It is another object of the invention to provide a cable raceway outlet which protects the raceway opening at the point of attachment.

[0009] It is another object of the invention to provide a cable raceway outlet which permits easy access to the raceway when necessary.

[0010] It is another object of the invention to provide a cable raceway outlet which protects fiber optic cable from damage by supporting the cable and restricting the bend radius of the cable when exiting or entering a fiber optic cable raceway.

[0011] It is another object of the invention to provide a cable raceway outlet which is useable with cable raceways made by various raceway manufacturers.

[0012] These and other objects of the present invention are achieved in the preferred embodiments disclosed below by providing a cable raceway outlet mountable to a cable raceway having a side wall terminating in a top edge, the raceway outlet comprising a transition assembly for being mounted over the top of the top edge of the raceway for supporting a cable passing between the raceway and a point outside the raceway and a clamping member carried by the transition assembly for contacting one of an inner or an outer surface of the side wall. A latching member is carried by the transition

assembly for contacting the other of the inner or outer surface of the side wall. The latching member is adapted for movement between a clamping position wherein the latching member and the clamping member are urged towards each other and against respective surfaces of the raceway sidewalls thereby clamping the side wall of the raceway between the latching member and the clamping member and a release position wherein the latching member and the clamping member are spaced-apart from each other sufficiently to permit the transition assembly to be removed from, placed on or moved along the length of the raceway.

[0013] According to one preferred embodiment of the invention, the latching member comprises a pivot member extending along a length of the clamping member and a cam mounted for pivotable movement on the pivot member between the clamping position wherein the cam is pivoted into an extended position against the sidewall of the raceway and the release position wherein the cam is pivoted into a retracted position in space-apart relation to the side wall of the raceway.

[0014] According to another preferred embodiment of the invention, a finger grip is carried by the cam for facilitating manual operation of the cam between the extended and release positions.

[0015] According to yet another preferred embodiment of the invention, the transition assembly includes at least one curved cable support wall for being positioned above the top edge of the raceway.

[0016] According to yet another preferred embodiment of the invention, the transition assembly includes first and second curved cable support walls for being positioned above the top edge of the raceway. The first curved wall is defined by a radius perpendicular to a longitudinal dimension of the cable raceway, and the second curved wall is defined by a radius parallel to the longitudinal dimension of the cable raceway.

[0017] According to yet another preferred embodiment of the invention, the cable raceway outlet includes an enlarged void defined by a wall of the transition assembly, the latching assembly and the clamping assembly for accommodating the top edge of cable raceways having an enlarged lip extending along the length of the top edge.

[0018] Preferably, the clamping member is positioned within the cable raceway for contacting the inner surface of the side wall, and the latching member is positioned outside the cable raceway for contacting the outer surface of the side wall.

[0019] According to yet another preferred embodiment of the invention, the transition assembly includes a plurality of parallel walls defining individual exit paths for individual cables or cable groups.

[0020] According to yet another preferred embodiment of the invention, the transition assembly including a protective transition assembly cover for being positioned onto the transition assembly for enclosing the cable passing between the raceway and a point outside the raceway;

[0021] According to yet another preferred embodiment of the invention, the transition assembly includes a raceway cover carried by the transition assembly cover for covering a top opening of the raceway defined by the side wall and a second, laterally spaced-apart side wall.

[0022] According to yet another preferred embodiment of the invention, the raceway cover is pivotally-mounted for movement between an open position allowing access to the raceway and a closed position covering the top opening of the raceway.

[0023] According to yet another preferred embodiment of the invention, a cable raceway outlet is provided for being mountable to a cable raceway having a side wall terminating in a top edge. The raceway outlet comprises a transition assembly for being mounted over the top of the top edge of the raceway and including a curved cable support wall for supporting a cable passing between the raceway and a point outside the raceway,

and first and second spaced-apart clamping members carried by the transition assembly for engaging the inner surface of the side wall of the raceway at spaced-apart points along the length of the raceway. An elongate latching member is carried by the transition assembly for engaging the outer surface of the side wall along the length of the raceway. The latching member is adapted for movement between a clamping position wherein the latching member and the first and second clamping members are urged towards each other and against respective outer and inner surfaces of the raceway sidewalls thereby clamping the side wall of the raceway between the latching member and the first and second clamping members, and a release position wherein the latching member and the clamping member are spaced-apart from each other sufficiently to permit the transition assembly to be removed from, placed on or moved along the length of the raceway.

[0024] According to yet another preferred embodiment of the invention, the latching member comprises a pivot member extending along a length of the clamping member, and a cam mounted for pivotable movement on the pivot member between the clamping position wherein the cam is pivoted into an extended position against the sidewall of the raceway and the release position wherein the cam is pivoted into a retracted position in space-apart relation to the side wall of the raceway.

[0025] According to yet another preferred embodiment of the invention, the latching assembly includes first and second finger grips carried by the cam for facilitating manual operation of the cam between the extended and release positions.

[0026] According to yet another preferred embodiment of the invention, the first and second finger grips are positioned on opposite ends of the latching member in alignment with respective first and second clamping members.

[0027] Preferably, the transition assembly includes at least one curved cable support wall for being positioned above the top edge of the raceway.

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[0028] According to yet another preferred embodiment of the invention, the transition assembly includes first and second curved cable support walls for being positioned above the top edge of the raceway, the first curved wall defined by a radius perpendicular to a longitudinal dimension of the cable raceway, and the second curved wall defined by a radius parallel to the longitudinal dimension of the cable raceway.

[0029] According to yet another preferred embodiment of the invention, the first and second curved cable support walls are integrally-formed and include an intermediate cable support wall providing a gradual curved transition between the first and second cable support walls.

[0030] According to yet another preferred embodiment of the invention, including an enlarged void defined by a wall of the transition assembly, the latching member and the first and second clamping members for accommodating the top edge of a cable raceway having an enlarged lip extending along the length of the top edge.

[0031] A method of exiting a cable from a cable raceway according to an embodiment of the invention comprising the steps of providing a transition assembly for being mounted over the top of the top edge of the raceway for supporting a cable passing between the raceway and a point outside the raceway, a clamping member carried by the transition assembly for contacting one of an inner or an outer surface of the side wall, and a latching member carried by the transition assembly for contacting the other of the inner or outer surface of the side wall. The latching member is adapted for movement between a clamping position wherein the latching member and the clamping member are urged towards each other and against respective surfaces of the raceway sidewalls thereby clamping the side wall of the raceway between the latching member and the clamping member and a release position wherein the latching member and the clamping member are spaced-apart from each other sufficiently to permit the transition assembly to be removed from, placed on or moved along the length of the raceway. The cable raceway

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outlet is placed onto the top edge of the cable raceway with the latching member in the release position, and without any alteration to the raceway sidewall and top edge thereof. The position of the cable raceway outlet is adjusted to the correct position to exit the cable at the correct position, and the latching member is moved to the clamping position.

[0032] According to one preferred embodiment of the invention, the method includes the step of removing at least one cable from the raceway and passing it from raceway through the cable raceway outlet.

[0033] According to another preferred embodiment of the invention, the method includes the steps of moving the latching member to the release position, moving the raceway outlet to a new position relative to the raceway, and moving the latching member to the clamping position with the raceway outlet in the new position.

[0034] According to yet another preferred embodiment of the invention, the step of moving the latching member to a new position includes the step of sliding the raceway outlet along the top edge of the raceway without removing it from the top edge of the raceway.

[0035] According to yet another preferred embodiment of the invention, the method includes the step of placing a transition assembly cover onto the transition assembly for protecting the cable therein.

[0036] According to yet another preferred embodiment of the invention, the method includes the steps of providing a raceway cover carried by the transition assembly cover, moving the raceway cover into a closed position for covering a top opening of the raceway, and moving the raceway cover into an open position for exposing the top opening of the raceway.

Brief Description of the Drawings

[0037] Some of the objects of the invention have been set forth above. Other objects and advantages of the invention will appear as the invention proceeds when taken in conjunction with the following drawings, in which:

[0038] Figure 1 is a perspective view of a cable raceway outlet according to one embodiment of the invention;

[0039] Figure 2 is a front elevation of the cable raceway outlet shown in Figure 1;

[0040] Figure 3 is a side elevation of the cable raceway outlet shown in Figure 1;

[0041] Figure 4 top plan view of the cable raceway outlet shown in Figure 1;

[0042] Figure 5 is a perspective view of another embodiment of the cable raceway outlet according to the invention;

[0043] Figure 6 is a front elevation of the cable raceway outlet shown in Figure 5;

[0044] Figure 7 is a side elevation of the cable raceway outlet shown in Figure 5;

[0045] Figure 8 is a top plan view of the cable raceway outlet shown in Figure 5;

[0046] Figure 9 is an exploded view of the cable raceway outlet shown in Figure 5 together with a length of raceway;

[0047] Figure 10 is a perspective view of another embodiment of the invention;

[0048] Figure 11 is a front elevation of the cable raceway outlet shown in Figure 10;

[0049] Figure 12 is a side elevation of the cable raceway outlet shown in the Figure 10;

[0050] Figure 13 is a side elevation of the cable raceway outlet shown in the Figure 10 in place on a raceway;

[0051] Figure 14 is a top plan view of the cable raceway outlet shown in Figure 10; and

[0052] Figure 15 is a top plan view of the cable raceway outlet shown in Figure 10, with the cover removed.

Description of the Preferred Embodiment and Best Mode

[0053] Referring now specifically to the drawings, a cable raceway outlet according to several closely related embodiments of the present invention is illustrated in Figures 1-15 and shown generally at reference numeral 10. The cable raceway outlet 10 is designed to sit on top of and straddle one side wall of a cable raceway. The cable raceway outlet 10 may be made in any size to accommodate different size raceways. Two typical-sized raceways with which the cable raceway outlet 10 is useable are two-inch by two-inch and four-inch by four-inch raceways. In general, the cable raceway outlet 10 is symmetrical side-to-side, so that reference to a pair of elements on opposite ends of the cable raceway outlet 10 is understood as referring to identical elements unless otherwise stated.

[0054] The cable raceway outlet 10 is constructed of molded, high-impact plastic which conforms to industry standards. Cable raceway outlet 10 includes a bracket assembly 11 by which it is attached to a raceway. See Figures 9 and 13. Bracket assembly 11 includes a pair of clamping members 12 on opposite ends of the cable raceway outlet 10 which cooperate with latching members 13 integrally formed on a pivotable latch arm 14 which extends the length of the cable raceway outlet 10. A pair of pads 15 carried on respective clamping members 12 provide improved adherence to the raceway and additional resilience during and after latching.

[0055] The latching members 13 have a curved face 16 which acts as a cam and bears against and moves along the outer sidewall of the raceway until it moves past an overcenter point, where it snaps into position with a flat face 17 flush in a latched position against the outer side wall with the outer sidewall pinched between the latching members 13 and the clamping members 12. This requires no tools and no alteration to the raceway. Precise adjustment and readjustment is possible merely by releasing the latching members 13 by pulling upwardly on the latching members 13 and thereby forcing the curved face 16 downwardly along the outer side wall of the raceway until it reaches a release position with

the latching members 13 in an approximate 90 degree position to the position shown in Figure 13. In this position the cable raceway outlet 10 is removable by lifting it off of the raceway, or laterally adjustable by sliding it along the raceway to the desired position. This is particularly useful feature, since it allows initial placement in the approximately correct position, and subsequent adjustment to the exact position. Since no cutting or other alteration of the raceway is necessary, adjustments of any degree can be made whenever needed.

[0056] An outlet transition assembly 20 is carried on the bracket assembly 11 and includes a pair of transition flanges 21 which guide the fiber optic cable out of the raceway from either direction without excessive bending. The transition flanges 21 guide the cables around a 90 degree bend into a downspout 30 which is normally inclosed by a cover 31 and includes several divider walls 60 for maintaining separation between individual cables. These divider walls are shown in Figure 15, where the downspout 30 is shown with the cover 31 removed. The downspout 30 can be mated with several different types of fittings for attachment to vertical raceways, terminations or the like. Compare Figures 1-4, 5-8, 10-15. See also Figure 9 (all embodiments in Figures 1-4, 5-8 and 10-15 alternatively shown).

[0057] The cover 31 latches to the downspout 30 by means of a pair of tabs 32 on the underside of cover 31 which interlock with a respective pair of notches 33 formed in the underside of opposite ends of the transition flange 21. See Figure 9.

[0058] Cable raceway outlet 10 also includes a hinged raceway cover 50 which is movable between a closed, horizontal position shown in Figure 13 where it overlaps the top of and encloses the top of the raceway, and on open position with the raceway cover 50 in a vertical position. In the open position, the raceway cover 50 exposes approximately one-third of the top opening of the raceway, and permits an installer to drop additional cable into the raceway without removing the cable raceway outlet 10.

[0059] As is apparent from the foregoing, the cable raceway outlet 10 can easily be attached to a raceway by placing the raceway outlet over a side wall of the raceway with the clamping members 12 on the inside of the raceway side wall and the latching members 13 on the outside in the open position. See Figures 3 and 13. With the top edge of the raceway side wall against the top of the bracket assembly 11 (Figure 13), the latching members 13 are moved to the position shown in Figures 3 and 13.

[0060] A cable raceway outlet is described above. Various details of the invention may be changed without departing from its scope. Furthermore, the foregoing description of the preferred embodiment of the invention and the best mode for practicing the invention are provided for the purpose of illustration only and not for the purpose of limitation--the invention being defined by the claims.